THE SCIENCE OF SURVIVAL

ACR ELECTRONICS

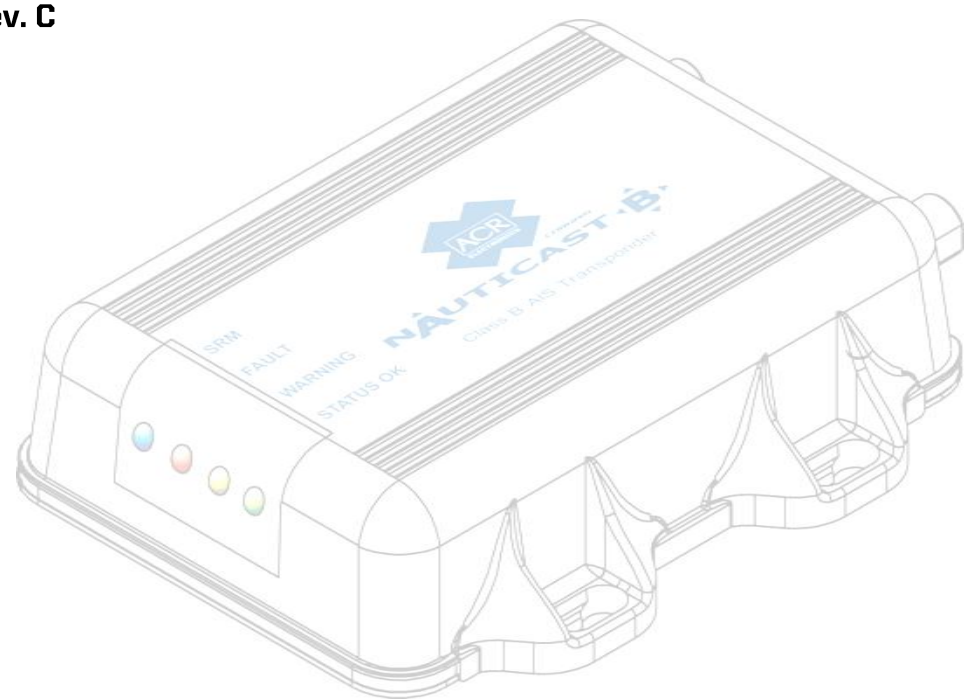
COBHAM

PRODUCT SUPPORT MANUAL

Nauticast™-B AIS // Class B Automatic Identification System

Model No.: AIS-300
Product No.: 2680

Y1-03-0222 Rev. C



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Tel: +1 (954) 981-3333 // Fax: +1 (954) 983-5087 // www.acrelectronics.com

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In the United States **WARNING:** It is a violation of the rules of the Federal Communications Commission to input an MMSI that has not been properly assigned to the end user, or to otherwise input any inaccurate data in this device.

WARNING: This product is a supplemental navigation tool only! The user assumes all responsibility associated with the use of this device and safe navigation.

It is important to understand that all vessels may not be equipped with AIS transponders and therefore may not be visible to this transponder. Likewise, certain conditions, such as equipment failures, the environment, improper use and crowded port scenarios, may exist whereby the vessel equipped with this AIS transponder is not visible to other AIS transponders.

CAUTION: Before proceeding to install, test or use your new ACR Electronics' product, please read this Product Support Manual in its entirety.

If you have questions regarding the contents of the manual, please contact our Technical Service Department at ACR Electronics, Inc., Telephone +1 (954) 981- 3333. Please be ready to provide the technician with the page number you wish to discuss. If you have a question that is not covered in the manual, please visit our website and access the Frequently Asked Questions (FAQs) section for further information or call our Technical Services Department. The website address is www.acrelectronics.com. If in the future you lose this manual, you may access and print a replacement on the ACR website.

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Table of Contents

SECTION 1 - WHAT IS AIS? _____ *4*

SECTION 2 - INSTALLATION _____ *6*

SECTION 3 - USING THE TRANSPONDER _____ *20*

SECTION 4 - MAINTENANCE _____ *22*

APPENDIX A - SERIAL DATA INTERFACE _____ *22*

APPENDIX B - SPECIFICATIONS AND WARNINGS _____ *28*

APPENDIX C - SYSTEM BLOCK DIAGRAM _____ *29*

APPENDIX D - DATA POWER CABLE INFORMATION _____ *30*

APPENDIX E - SUPPORT, WARRANTY, USEFUL LIFE and NOTICES _____ *31*

⚠ PLEASE READ ALL WARNINGS, CAUTIONS AND NOTES CAREFULLY

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SECTION 1 - WHAT IS AIS?

1. Overview

AIS is an acronym for **A**utomatic **I**dentification **S**ystem. AIS increases navigational safety and collision avoidance by transmitting vessel identification, helping to reduce the difficulty of identifying ships when not in sight (e.g. at night, in radar blind arcs or shadows or at distance) by broadcasting navigational intentions to other vessels by providing ID, position, course, speed and other ship data with all other nearby ships and land based stations.

According to International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) regulations, AIS is defined as follows:
AIS is a broadcast transponder system, operating in the VHF maritime mobile band. It is capable of sending ship information such as identification, position course, speed and more, to other ships and to shore. It can handle multiple reports at rapid update rates and uses Carrier Sense Time Division Multiple Access (CSTDMA) technology to meet these high broadcast rates and ensure reliable and robust ship to ship operation.

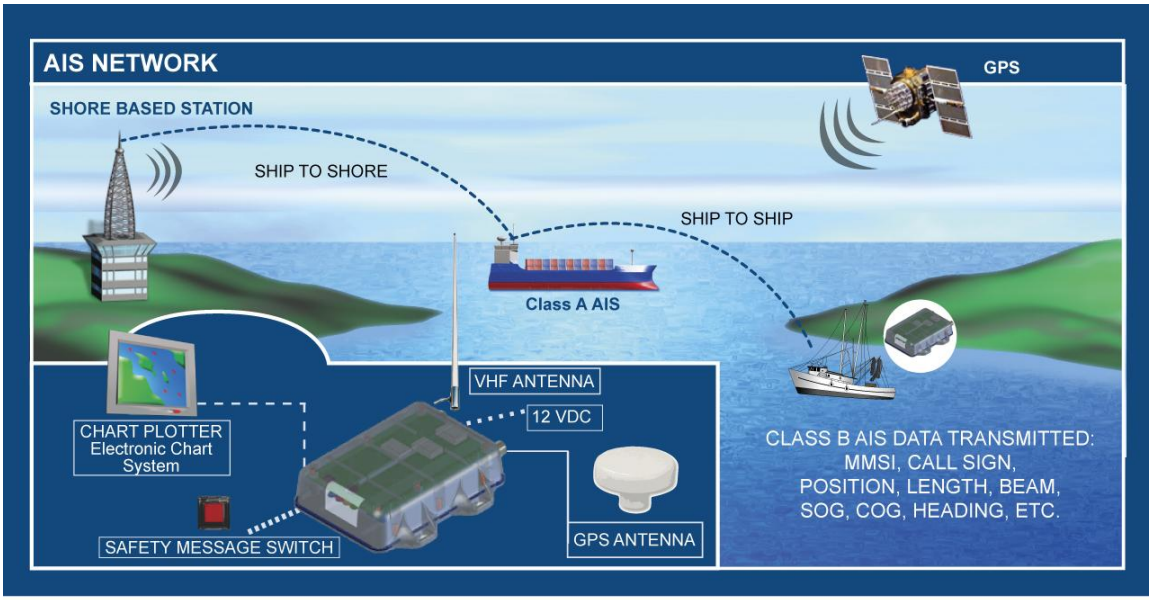
The International Maritime Organization (IMO) defines the performance standards as follows:
Ship to ship working, ship to shore working, including long range application, automatic and continuous operation, provision of information messaging via PC and utilization of maritime VHF channels

The Modules: GPS system, AIS Transponder, VHF Antenna, and the Data Power Cable (appropriate application software connects the individual modules).

AIS are required to function flawlessly in a variety of modes. The regulations require that the system be capable of:

- An "**autonomous and continuous**" mode for operation in all areas. This mode shall be capable of being switched to/from one of the following alternate modes by a competent authority;
- An "**assigned**" mode for operation in an area subject to a competent authority responsible for traffic monitoring such that the data transmission interval and/or time slots may be set remotely by that authority;
- A "**polling or controlled**" mode, where the data transfer occurs in response to interrogation from a ship or competent authority.

This illustration depicts a typical AIS System, where two or more AIS equipped vessels (and shore based systems) are automatically communicating with each other.



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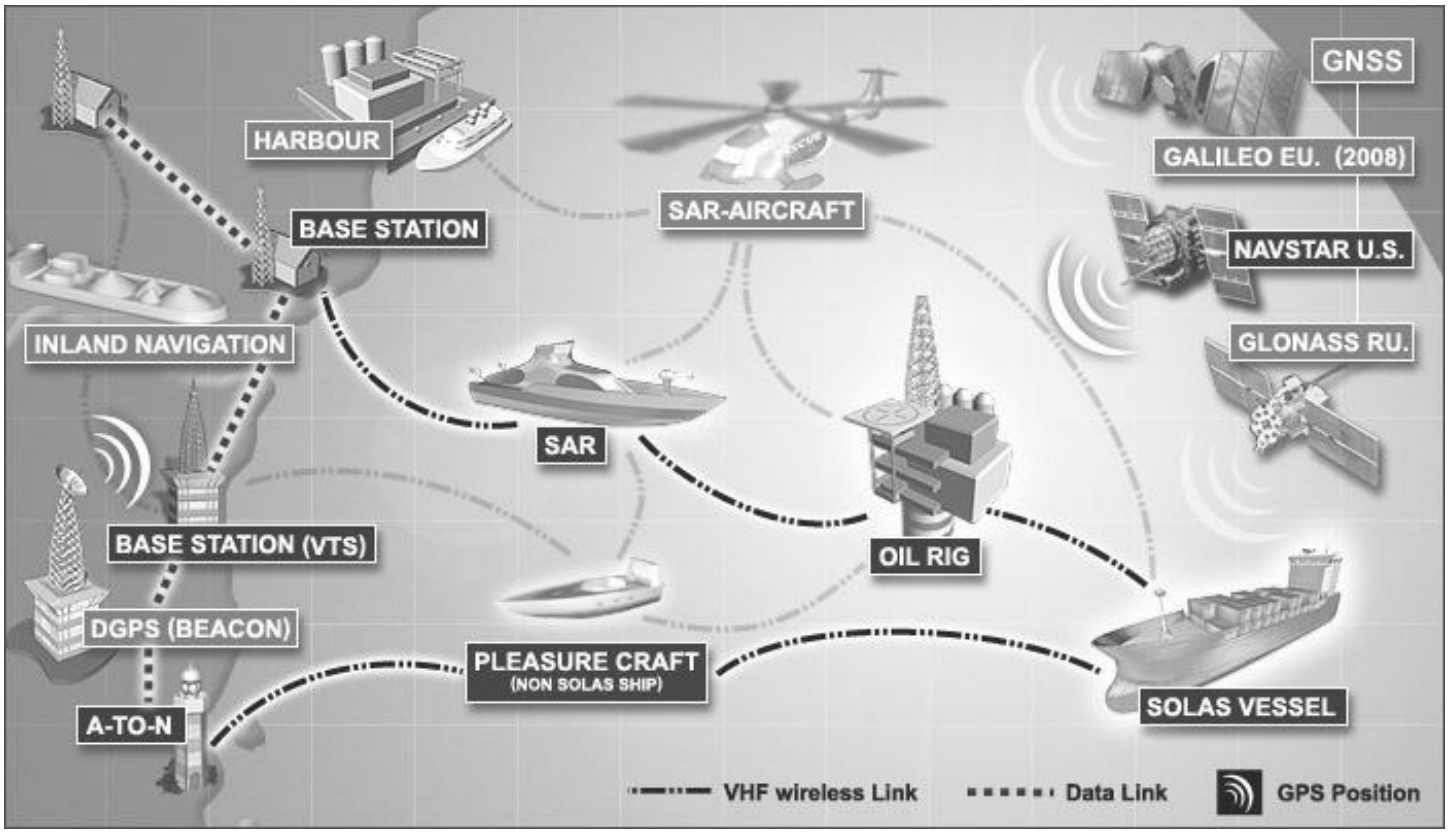
On the bottom, a typical Nauticast™-B AIS installation in a common environment is shown. The Nauticast™-B AIS is connected to the vessel's power supply, and, in connection with the VHF and GPS antennas, the minimal requirements for transponder operation are fulfilled.

Both vessels in the above illustration are equipped with an AIS transceiver. Due to "Time – Synchronization", they use the same organization of free and allocated windows (slots) in the shared VHF Data Link (this method is called "Carrier Sense Time Division Multiple Access") to send and receive messages. Without the necessity of any operator interaction, both vessels know exactly who or what is cruising nearby and where the individual object is heading.

The scenario below shows a full AIS coverage area (including all applications and complete shore infrastructure).



2. AIS classes

There are two classes of AIS units fitted to vessels, Class A and Class B. In addition, AIS base stations may be employed by the Coast Guard, port authorities and other authorized bodies. AIS units acting as Aids to Navigation (A to N) can also be fitted to fixed and floating navigation markers such as channel markers and buoys.

Class A units are a mandatory fit under the Safety of Life at Sea (SOLAS) convention to vessels above 300 gross tons, or which carry more than 11 passengers in international waters. Many other commercial vessels and some leisure craft also may be fitted with Class A units.

Class B units are designed for fitting in vessels which do not fall into the mandatory Class A fit category. **The ACR Nauticast™-B Automatic Identification System is a Class B AIS unit.**

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In order to meet carriage requirements for Class A and Class B AIS systems, dedicated GPS and VHF antennas must be fit to the transponders. ACR has included GPS and VHF antennas that have been specifically designed, tested and approved for use with the Nauticast™-B. ACR Electronics Inc. does not recommend or support using other antennas or sharing data information from existing shipboard installations.

Class B AIS transponders will transmit data to other AIS equipped vessels and shore base stations. Static data typically identifies the vessel and does not change (i.e. MMSI, Vessel Name). Dynamic data is voyage specific and will change during the normal operation of the vessel.(i.e. Speed Over Ground, Position, Heading).

In order to complete the programming of your AIS transponder, documentation of your vessel's identity needs to be made available. This would be a good time to update any information that is inaccurate in the MMSI data base or with your ship's radio station license. These databases should be reviewed periodically to make sure the information is accurate including your emergency contact information.

Per FCC rules (United States users only) the static data can only be programmed into an AIS Transponder by the vendor or qualified personnel. Once the static data is programmed into an AIS Transponder it can only be corrected by ACR Electronics. Please check that the static data are entered carefully. If the static data are incorrectly programmed the transponder will need to be returned to ACR for factory reset.

Information transmitted from vessels that have a Class A AIS transponders on-board include:

- Name of Vessel
- Speed (SOG)
- Position
- MMSI Number
- Rate of Turn
- Destination
- Call Sign
- Course (COG)
- Navigational Status
- IMO Number
- Size of Vessel
- ETA
- Type of Vessel
- Heading
- Vessel Dimensions
- Draft
- Status
- Cargo

Information transmitted from vessels that have a Class B AIS transponders on-board include:

- Name of Vessel
- Speed (SOG)
- Position
- MMSI Number
- Call Sign
- Vessel Dimensions
- Type of Vessel
- Heading
- Course (COG)

NOTE: For information reporting intervals, see Specifications appendix

NOTE: The marine AIS system uses position information derived from networks such as the Global Positioning Satellite (GPS) or the Global Navigation Satellite System (GLONASS) to determine the location of the AIS unit and thus the vessel to which it is fitted. The Nauticast™-B AIS utilizes the GPS satellite network.

It is desirable wherever possible therefore to verify both your vessel's AIS derived position data and other vessels' AIS derived position data with visual or radar based observations.

SECTION 2 - INSTALLATION

1. Product contents

Before proceeding with the installation of the Nauticast™-B AIS, please verify that the content of the box includes the following:

- Nauticast™-B AIS transponder
- Data/Power cable
- Mounting hardware (4 self tapping screws)
- Strain relief cable straps (3)
- VHF antenna (dedicated for AIS use only) with connection cable
- GPS antenna (dedicated for AIS use only) with connection cable
- Nauticast™-B AIS Product Support Manual
- Nauticast™-B Mounting Template
- Link2AIS™ Software CD
- Link2AIS™ Software User Guide
- Warranty card

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2. Installation overview and prerequisites

In the United States WARNING: It is a violation of the rules of the Federal Communications Commission to input an MMSI that has not been properly assigned to the end user, or to otherwise input any inaccurate data in this device.

The US FCC regulation states that “The entry of static data into a Class B AIS device shall be performed by the vendor of the device or by an appropriately qualified person in the business of installing marine communications equipment on board vessels. In no event shall the entry of static data into a Class B AIS device be performed by the user of the device or the licensee of a ship station using the device. Knowingly programming a Class B AIS device with inaccurate static data, or causing a Class B AIS device to be programmed with inaccurate static data, is prohibited.**”**
In the USA, some of the following steps must be performed by your vendor or a professional installer. Outside of the USA, the owner may perform all of these steps. The installation process has four separate steps. Complete each step before proceeding to the next.

- Compile ship’s static data for installation (MMSI, vessel name, call sign, AIS GPS antenna position)
- Have static data programmed into transponder
- Install the Link2AIS™ Software onto your PC.
- Install your AIS hardware to your vessel.

NOTE: In most countries the operation of an AIS unit is included under the vessel’s marine VHF license provisions. The vessel onto which the AIS unit is to be installed must therefore possess a current VHF Ship station license which lists the AIS system and the vessel Call Sign and MMSI number.

Please contact the relevant authority in your country for more information.

The application will install and launch automatically. A Start Menu folder and shortcut will be created with the name 'Link2AIS'. This short cut should be used to re-launch the application as required.

Prerequisites

The Link2AIS™ Software is designed to operate with Microsoft Windows® 2000 (SP 3), Windows® XP (SP 2) and above. Recommended minimum system requirements are:

- Microsoft Windows® 2000 SP3 or Microsoft Windows® XP SP2
- Display resolution of at least 1024 x 768
- At least one RS232 serial port (or serial to USB converter already installed)
- A pointing device (mouse or equivalent)

This software uses the Microsoft .NET® connection software V2.0. The framework will be automatically installed during setup if not already present on the system.

NOTE: In most countries the operation of an AIS unit is included under the vessel’s marine VHF license provisions. The vessel onto which the AIS unit is to be installed must therefore possess a current VHF Ship station license which lists the AIS system and the vessel Call Sign and MMSI number.

Please contact the relevant authority in your country for more information.

3. Software installation

Before installing a new version it may be necessary to remove any prior version of the Link2AIS™ software from your PC. When the old version cannot be overwritten, the installation program tells you to uninstall the previous version first. The program can be removed (uninstalled) at any time using the uninstall feature located in the program directory within the start menu (if applicable) or with the “Add or Remove Programs” function within Windows®.

- Insert the installation CD.
- If the installation does not start automatically, locate the file “setup.exe” on the CD-ROM drive and double-click on this file to start the installation process.

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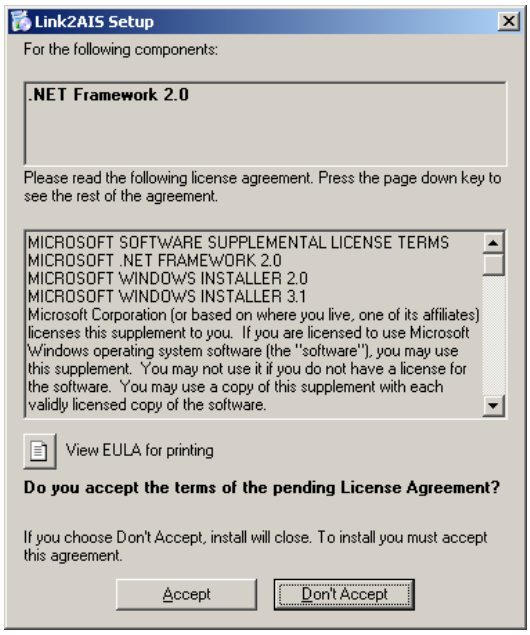
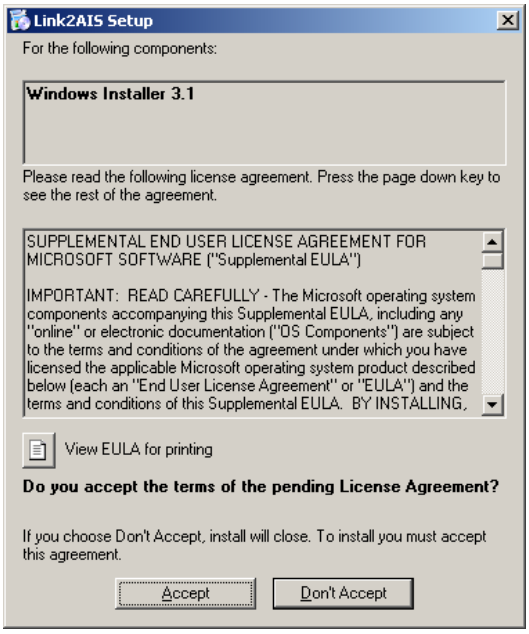
Or, when you have downloaded an upgrade:

- Unzip the package when necessary and start the installer program as described in “Installation of the Link2AIS™ Software” (later in this section).

If one of the following dialogs is shown when the installation process is started, the .NET® framework and/or the Windows® Installer needs to be installed. See the following sections for the installation of these required products. If neither of these dialogs is shown, the installation continues as described in “Installation of the Link2AIS™ Software Program” (later in this section).


Link2AIS Setup
For the following components:
.NET Framework 2.0
Please read the following license agreement. Press the page down key to see the rest of the agreement.
MICROSOFT SOFTWARE SUPPLEMENTAL LICENSE TERMS
MICROSOFT .NET FRAMEWORK 2.0
MICROSOFT WINDOWS INSTALLER 2.0
MICROSOFT WINDOWS INSTALLER 3.1
Microsoft Corporation (or based on where you live, one of its affiliates) licenses this supplement to you. If you are licensed to use Microsoft Windows operating system software (the "software"), you may use this supplement. You may not use it if you do not have a license for the software. You may use a copy of this supplement with each validly licensed copy of the software.
View EULA for printing
Do you accept the terms of the pending License Agreement?
If you choose Don't Accept, install will close. To install you must accept this agreement.
Accept
Don't Accept


Link2AIS Setup
For the following components:
Windows Installer 3.1
Please read the following license agreement. Press the page down key to see the rest of the agreement.
SUPPLEMENTAL END USER LICENSE AGREEMENT FOR MICROSOFT SOFTWARE ("Supplemental EULA")
IMPORTANT: READ CAREFULLY - The Microsoft operating system components accompanying this Supplemental EULA, including any "online" or electronic documentation ("OS Components") are subject to the terms and conditions of the agreement under which you have licensed the applicable Microsoft operating system product described below (each an "End User License Agreement" or "EULA") and the terms and conditions of this Supplemental EULA. BY INSTALLING,
View EULA for printing
Do you accept the terms of the pending License Agreement?
If you choose Don't Accept, install will close. To install you must accept this agreement.
Accept
Don't Accept

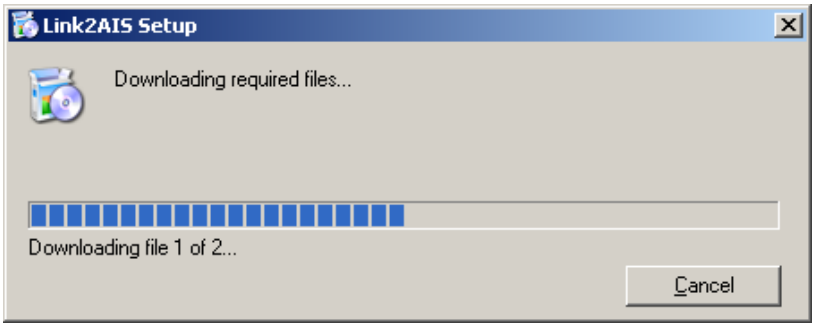
4. Installation of the .NET® Framework

You may install the .NET® framework from the original CD or you can download it from the Microsoft website. When downloading the .NET® framework or the Windows® Installer manually, you need to look for version 2 of the “dotnetfx.exe” and the required installer, named “WindowsInstaller-KB893803-v2-x86.exe”.

From the internet

The Link2AIS™ software will automatically find, download, and install the .NET® framework directly from the Microsoft website if your computer has an active internet connection.

When downloading over a 56k-modem, the .NET® framework will take about one hour to complete: The size is approx. 23MB.



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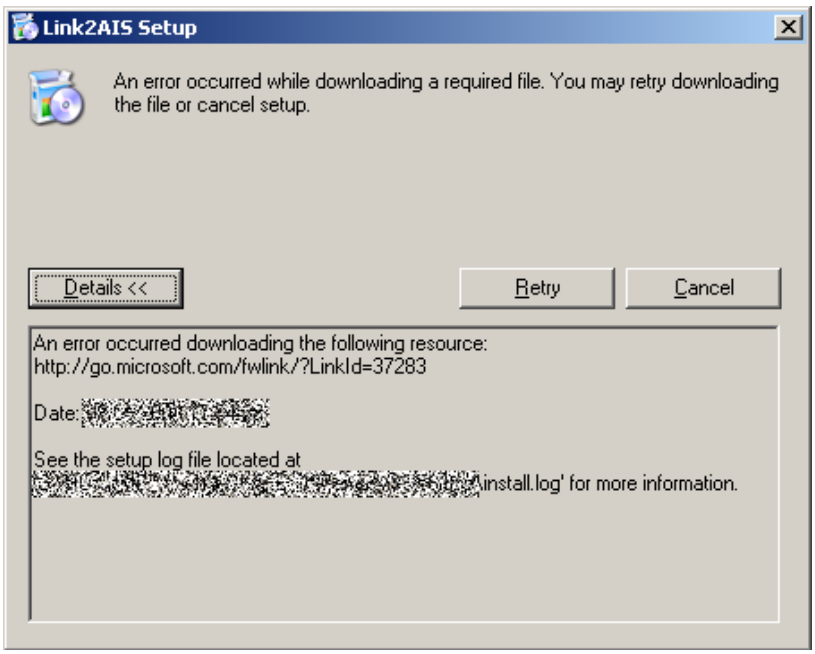
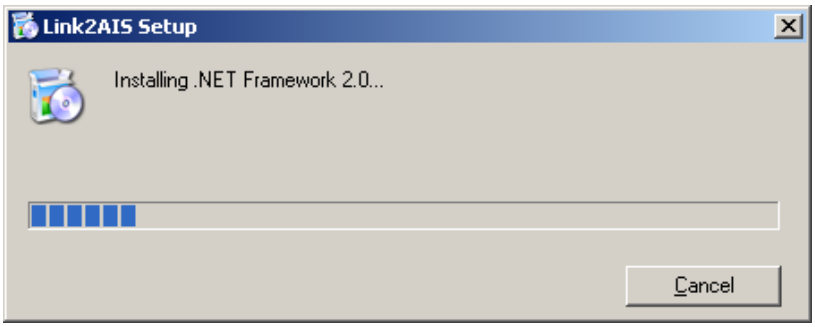
When you are not connected to the internet, an error message like the one below will be shown.


Link2AIS Setup
An error occurred while downloading a required file. You may retry downloading the file or cancel setup.
Details <<
Retry
Cancel
An error occurred downloading the following resource:
http://go.microsoft.com/fwlink/?LinkId=37283
Date:
See the setup log file located at
\install.log' for more information.

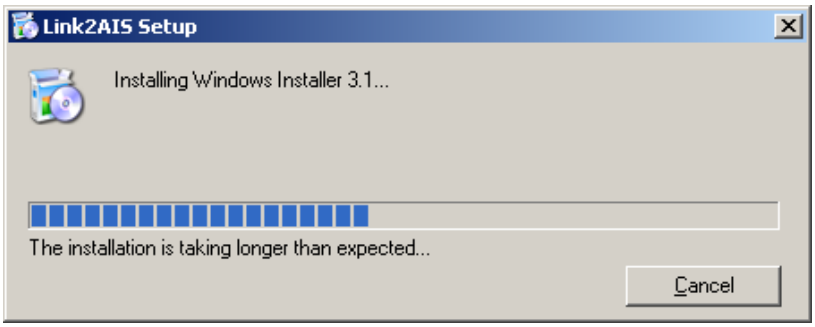
From the CD

If you do not want to download the .NET® framework from the Microsoft website, terminate the download process by clicking the “Cancel” button in the download dialog box and install the package directly from the CD. Locate the file “dotnetfx.exe” and double-click it to start the installation. Follow the instructions.



5. Installation of the Windows Installer

Locate the file “WindowsInstaller-KB893803-v2-x86.exe” and double-click it to start the installation.



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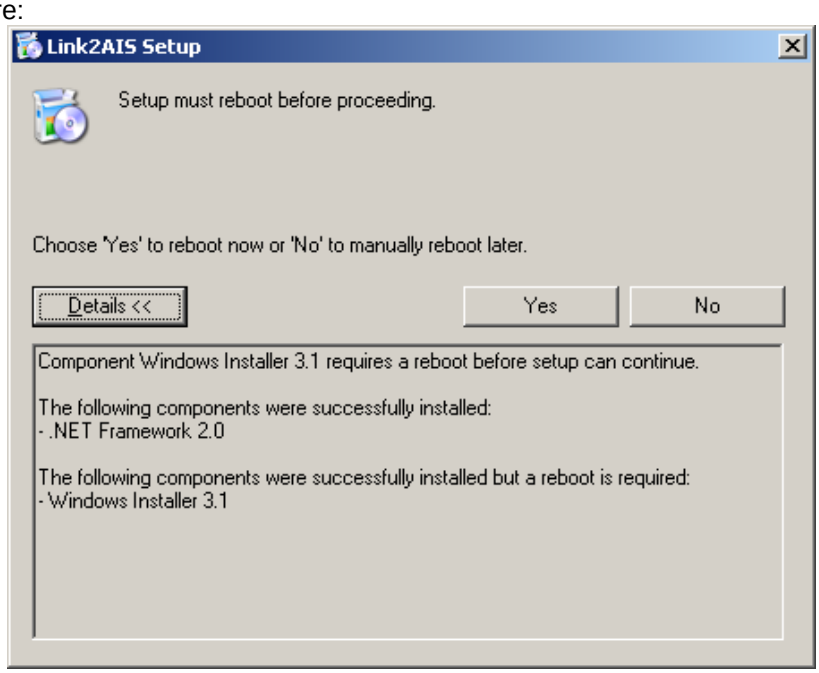
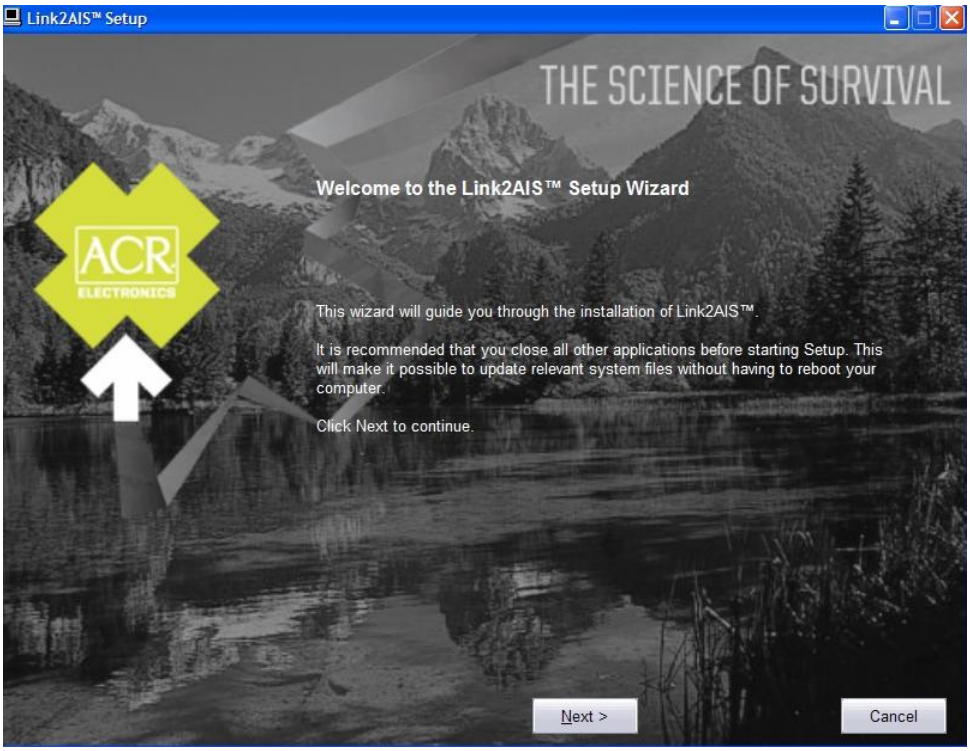
When the installation process has finished, you **MUST** reboot your computer in order to install the Link2AIS™ Software:


Link2AIS Setup
Setup must reboot before proceeding.
Choose 'Yes' to reboot now or 'No' to manually reboot later.
Details <<
Yes
No
Component Windows Installer 3.1 requires a reboot before setup can continue.
The following components were successfully installed:
- .NET Framework 2.0
The following components were successfully installed but a reboot is required:
- Windows Installer 3.1

6. Installation of the Link2AIS™ Software

Unzip the downloaded package when necessary.
Locate the files “setup.exe” and the accompanying “msi” file, then double-click on “setup.exe”
The installation process of the application starts with the Welcome screen:


Link2AIS™ Setup
THE SCIENCE OF SURVIVAL
ACR
ELECTRONICS
Welcome to the Link2AIS™ Setup Wizard
This wizard will guide you through the installation of Link2AIS™.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

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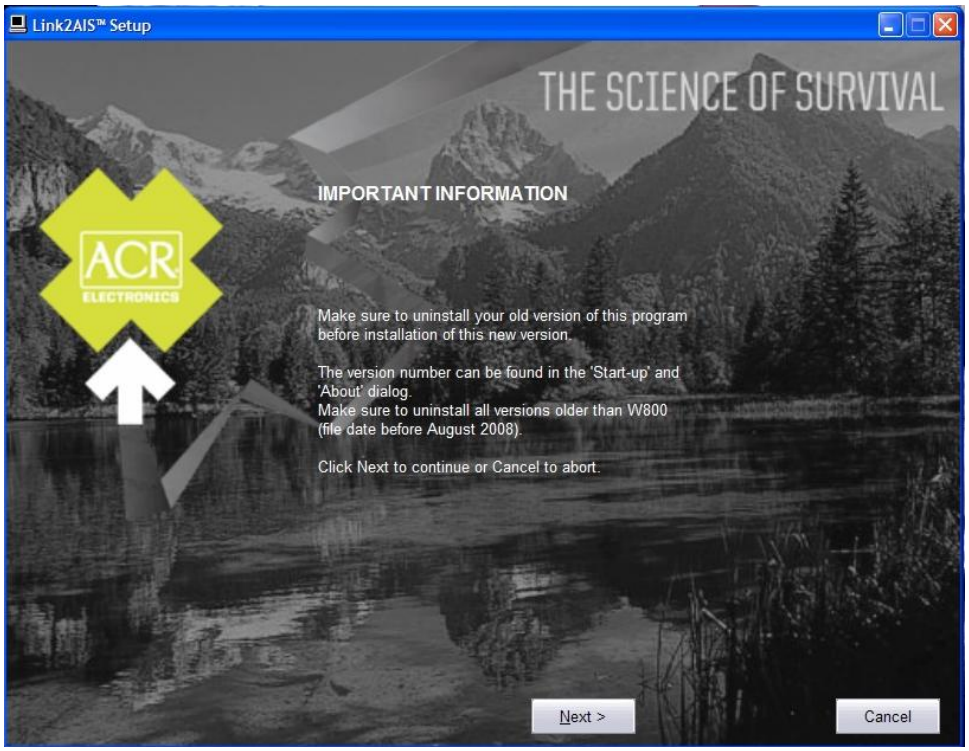
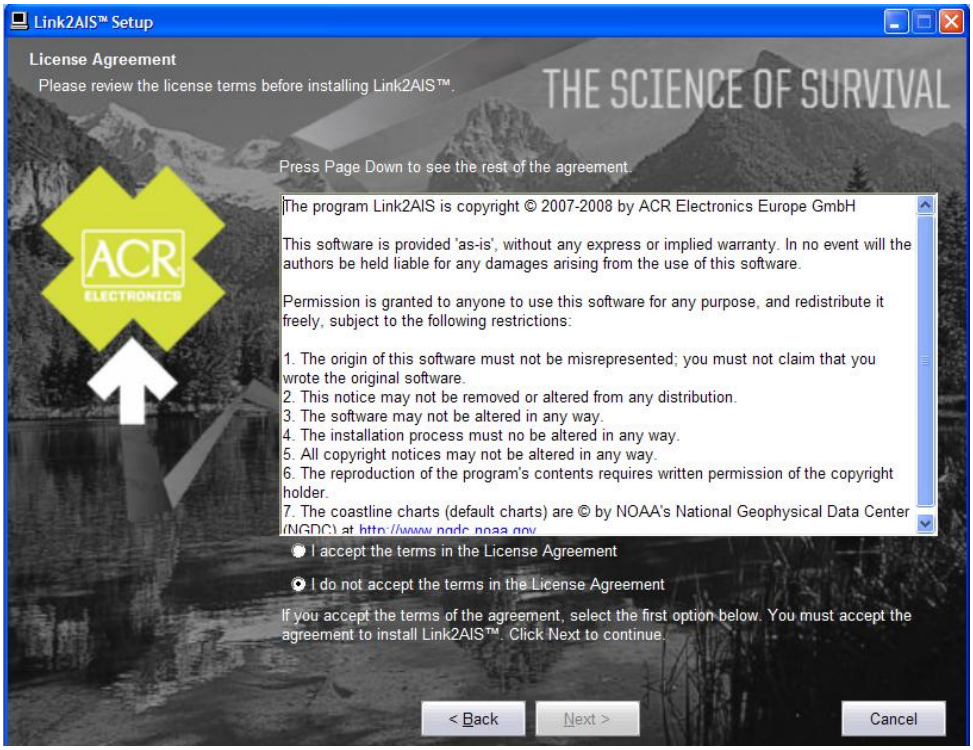
A dialog box will appear reminding you to uninstall any prior versions of the Link2AIS™ software (if applicable) before continuing the install process.


Link2AIS™ Setup
THE SCIENCE OF SURVIVAL
IMPORTANT INFORMATION
Make sure to uninstall your old version of this program before installation of this new version.
The version number can be found in the 'Start-up' and 'About' dialog.
Make sure to uninstall all versions older than W800 (file date before August 2008).
Click Next to continue or Cancel to abort.
Next >
Cancel

Read through and accept the license agreement and click Next.


Link2AIS™ Setup
License Agreement
Please review the license terms before installing Link2AIS™.
THE SCIENCE OF SURVIVAL
Press Page Down to see the rest of the agreement.
The program Link2AIS is copyright © 2007-2008 by ACR Electronics Europe GmbH
This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.
Permission is granted to anyone to use this software for any purpose, and redistribute it freely, subject to the following restrictions:
1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software.
2. This notice may not be removed or altered from any distribution.
3. The software may not be altered in any way.
4. The installation process must no be altered in any way.
5. All copyright notices may not be altered in any way.
6. The reproduction of the program's contents requires written permission of the copyright holder.
7. The coastline charts (default charts) are © by NOAA's National Geophysical Data Center
I accept the terms in the License Agreement
I do not accept the terms in the License Agreement
If you accept the terms of the agreement, select the first option below. You must accept the agreement to install Link2AIS™. Click Next to continue.
< Back
Next >
Cancel

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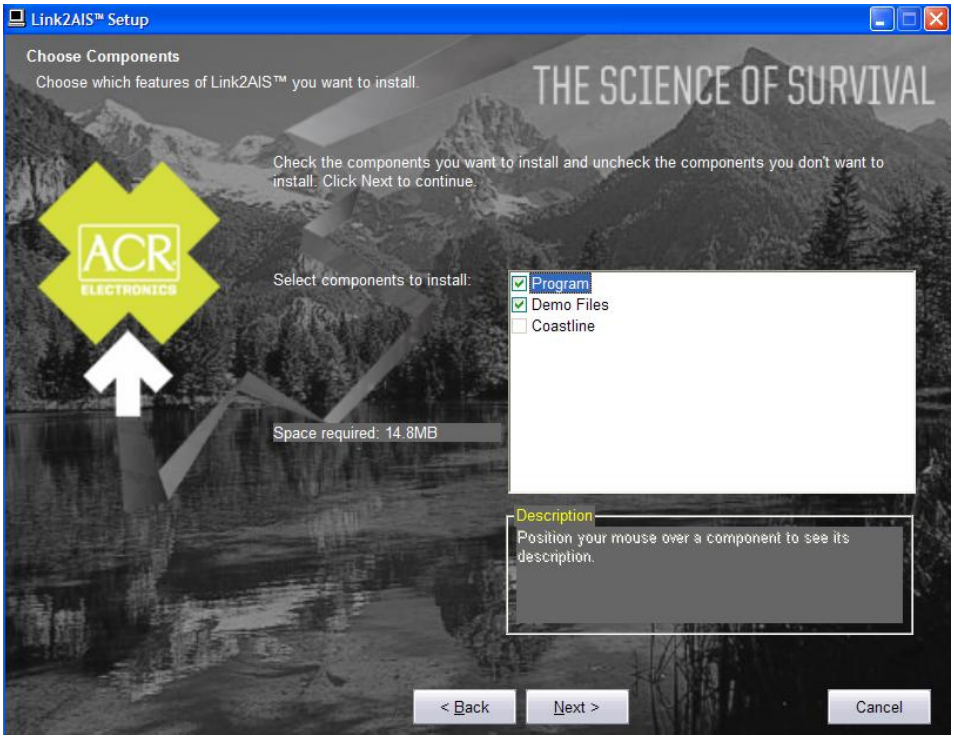
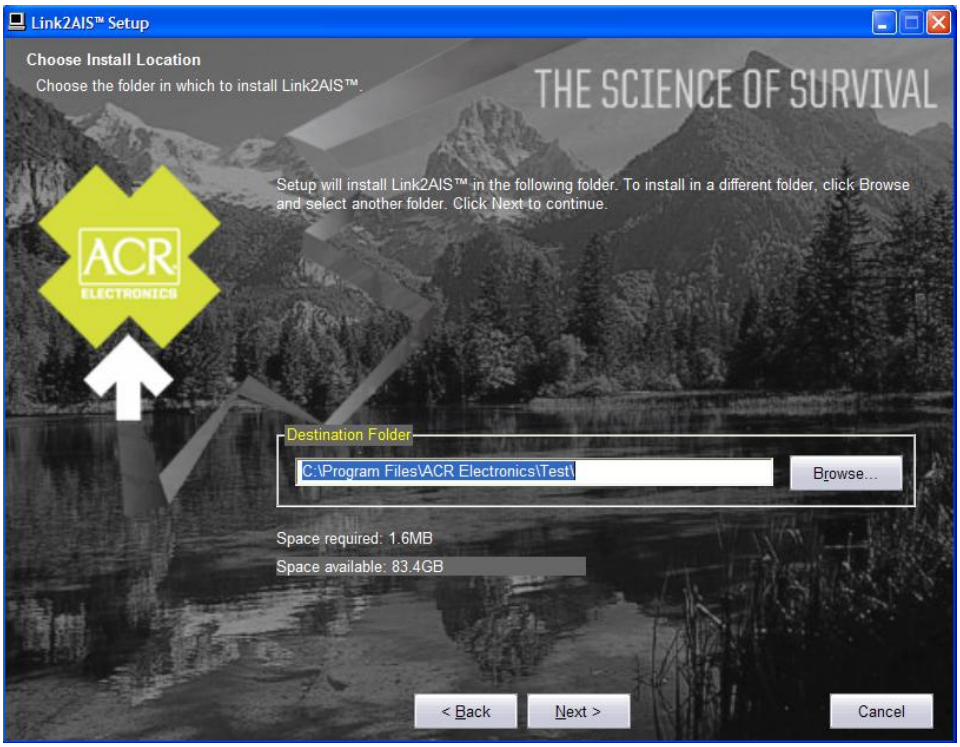
The next screen will allow you to pick options to be installed. These options are checked by default.


Link2AIS™ Setup
Choose Components
Choose which features of Link2AIS™ you want to install.
THE SCIENCE OF SURVIVAL
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
ACR ELECTRONICS
Select components to install:
Program
Demo Files
Coastline
Space required: 14.8MB
Description
Position your mouse over a component to see its description.
< Back
Next >
Cancel

Choose a directory where the software will be installed. Make note of this directory, as you will need to manually copy files to this location later on in the install process.


Link2AIS™ Setup
Choose Install Location
Choose the folder in which to install Link2AIS™.
THE SCIENCE OF SURVIVAL
Setup will install Link2AIS™ in the following folder. To install in a different folder, click Browse and select another folder. Click Next to continue.
ACR ELECTRONICS
Destination Folder
C:\Program Files\ACR Electronics\Test\
Browse...
Space required: 1.6MB
Space available: 83.4GB
< Back
Next >
Cancel

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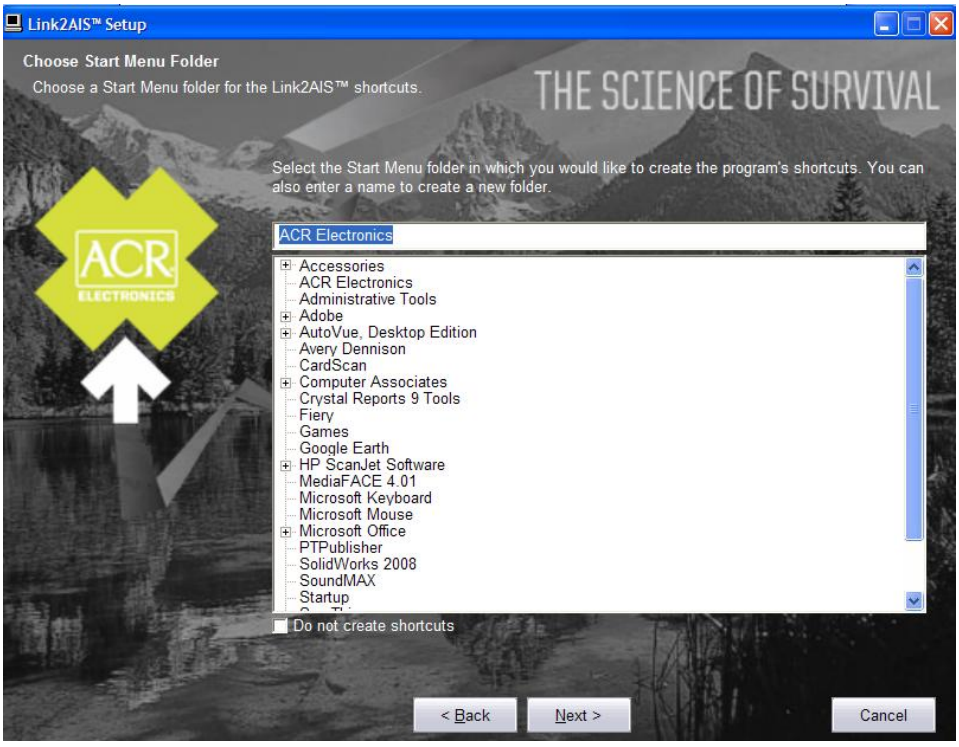
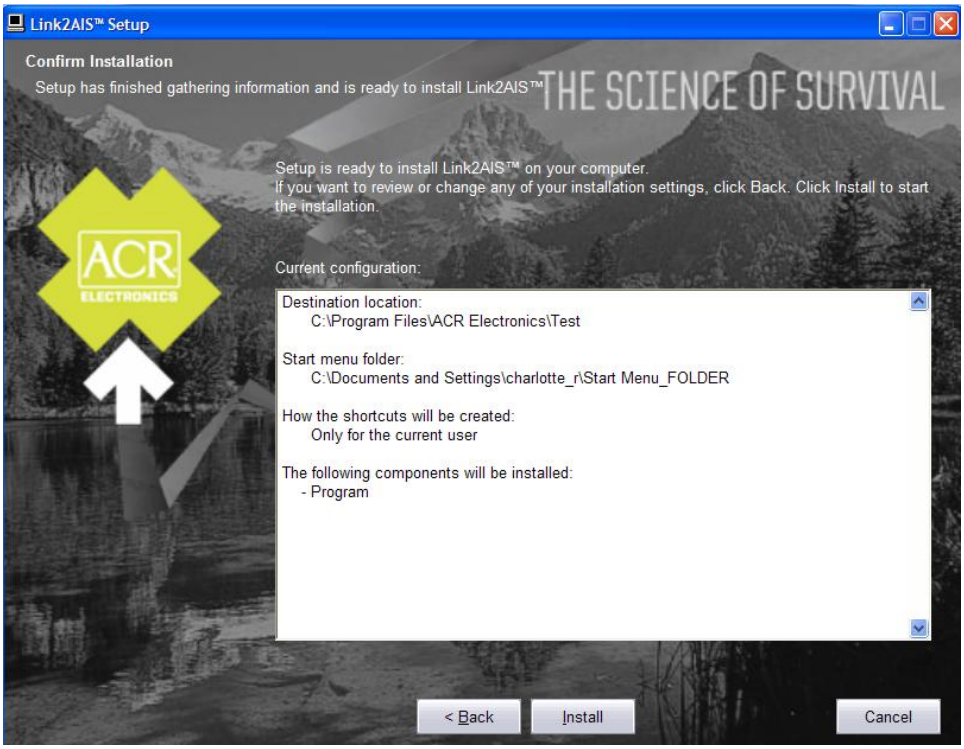
The software will ask you to choose a location in the Start menu to place the program's shortcuts:



The next screen will ask you to confirm the install settings you have provided in the previous steps:


Link2AIS™ Setup
Confirm Installation
Setup has finished gathering information and is ready to install Link2AIS™
THE SCIENCE OF SURVIVAL
Setup is ready to install Link2AIS™ on your computer.
If you want to review or change any of your installation settings, click Back. Click Install to start the installation.
Current configuration:
Destination location:
C:\Program Files\ACR Electronics\Test
Start menu folder:
C:\Documents and Settings\charlotte_r\Start Menu_FOLDER
How the shortcuts will be created:
Only for the current user
The following components will be installed:
- Program
< Back
Install
Cancel

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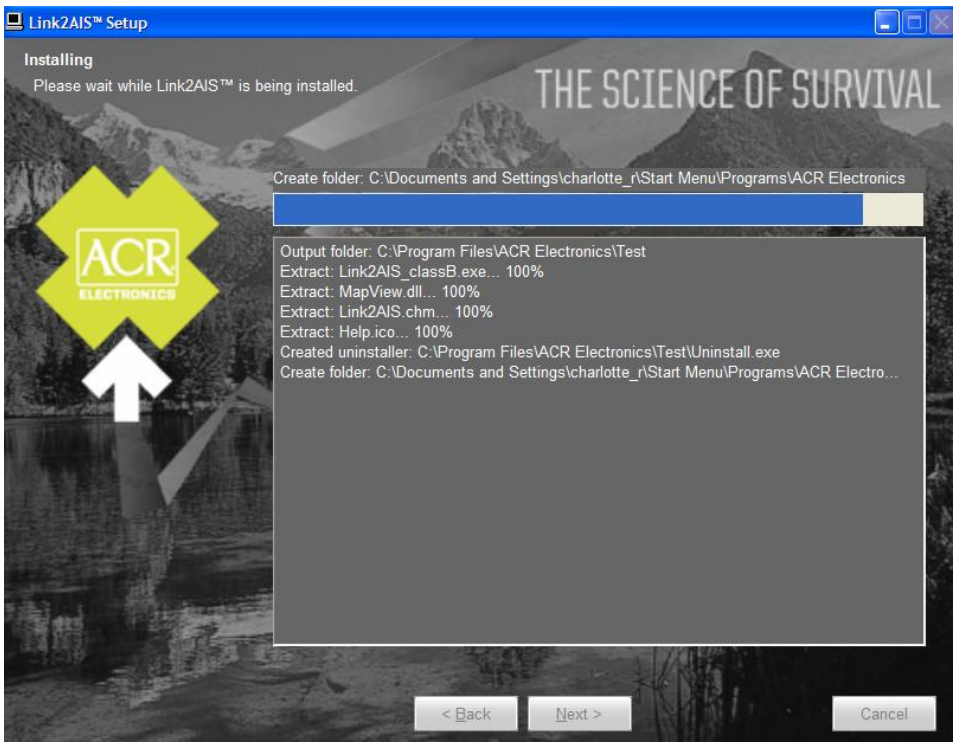
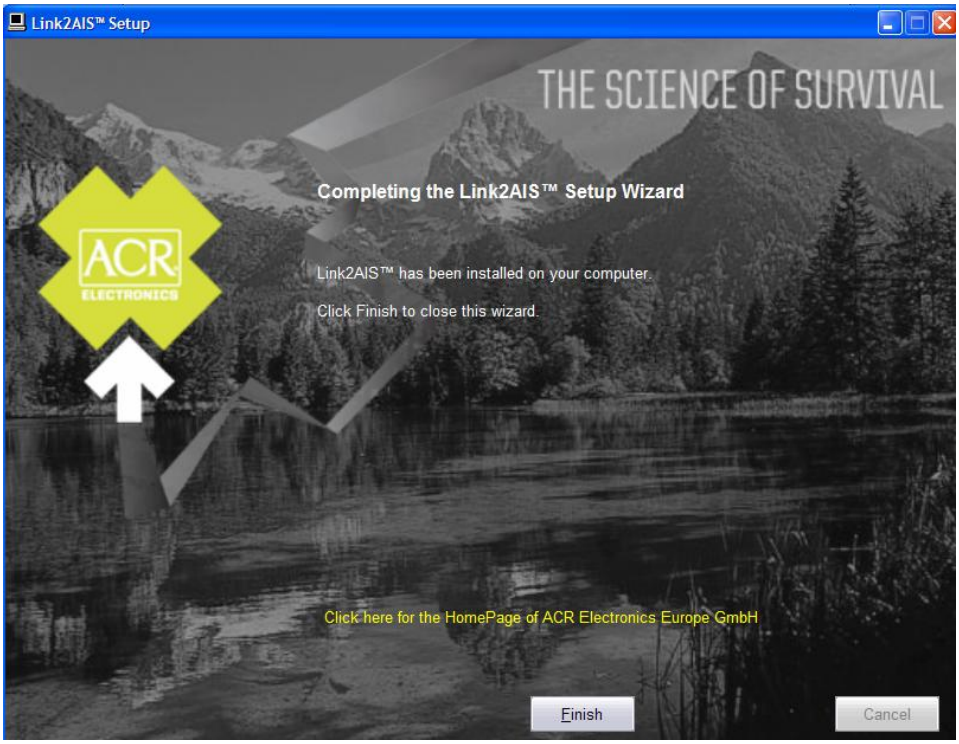
Now the application will install automatically in the folder you have chosen:



The install program will tell you when installation has been completed. Click Finish.


Link2AIS™ Setup
THE SCIENCE OF SURVIVAL
Completing the Link2AIS™ Setup Wizard
Link2AIS™ has been installed on your computer.
Click Finish to close this wizard.
Click here for the HomePage of ACR Electronics Europe GmbH
Finish
Cancel

Finally, find the Coastlines folder on the installation CD and copy to the install directory chosen during the install process. If you are unable to find this directory, you can right-click the program icon on your desktop or in the Start menu, go to Properties, and look at the location shown in the “Start In” field.

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- You will find the installed program shortcuts in the Start Menu / All Programs/ ACR Electronics directory (unless you chose a different location during the install process).
- A shortcut named “Link2AIS” will be placed on your desktop.
- Use either shortcut to launch the program.

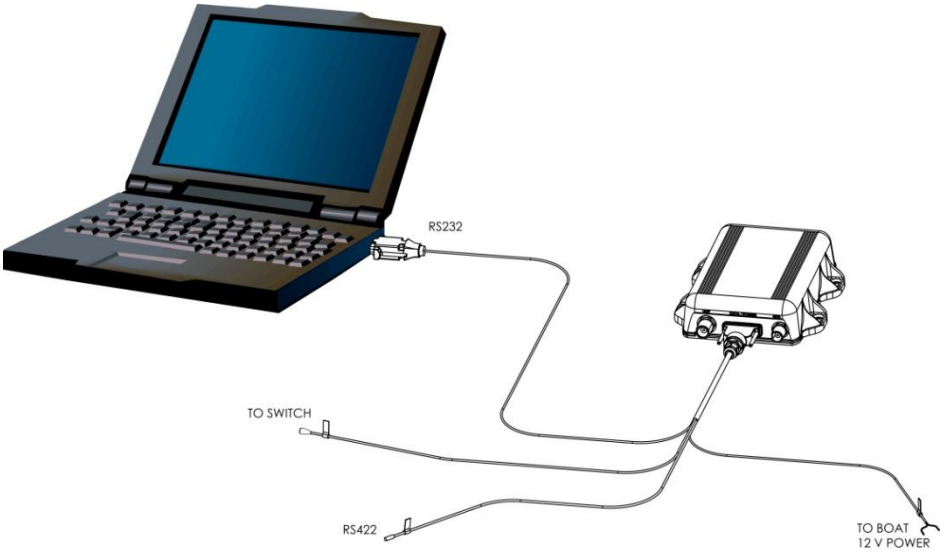
7. Connecting to a personal computer (PC)

NOTE: To program your Nauticast™-B AIS you will need to connect the AIS to a personal computer and supply the Nauticast™-B AIS with 12V of power.

ACR recommends that you connect the AIS to your boat’s power and connect it to a laptop in order to easily program your AIS before physically mounting the transceiver.

Connect the RS232 (9-Pin Connector) to your laptop. This connects between the supplied data lead and the PC. See illustration below. If the PC being used for programming does not have a 9-pin serial port then a commercially available USB to serial adaptor (RS 232) may be required.

Connect the AIS to your boat’s interior power supply (12 V). The red wire is the positive lead and the black wire is the negative lead.



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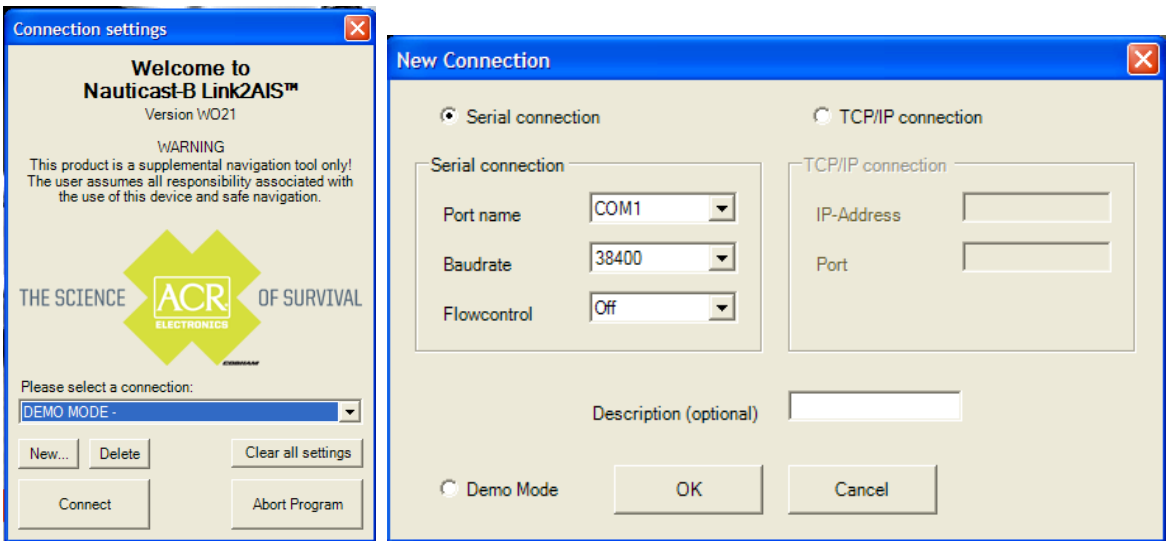
Start up Link2AIS™ Software program on PC. The initial application screen will appear as shown:



The application requires a serial connection to a Nauticast™-B AIS transponder. Connect the transponder to an available serial port. If your serial port is not located in the drop down box, select 'New…' and create a new connection.

Select the serial port from the drop down menu, then click 'Connect':

Once a connection is established, the application is ready to use. Connection status is indicated at the bottom left of the application window:

8. Help file

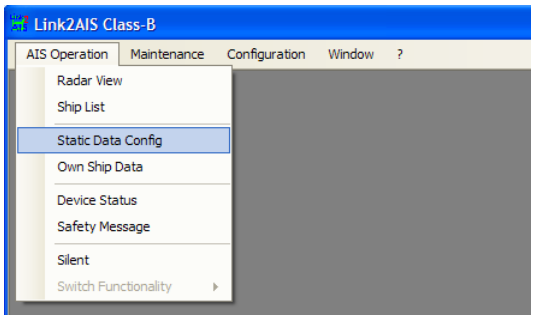
There is a context based Help file which explains what each data entry field means and what sort of data is expected.

9. Software structure

The functions of Link2AIS™ Software are arranged in a series of tabs. Each tab contains information relating to a particular aspect of the connected AIS transponder. Depending on the version of Link2AIS™ Software installed, not all tabs shown below may be visible.

10. INSTALLERS ONLY: Entering static data

Select the Monitoring tab and open the static data tab. This will display the static data for the connected AIS transponder. This includes the vessel's name, call sign, MMSI number and other fixed information.



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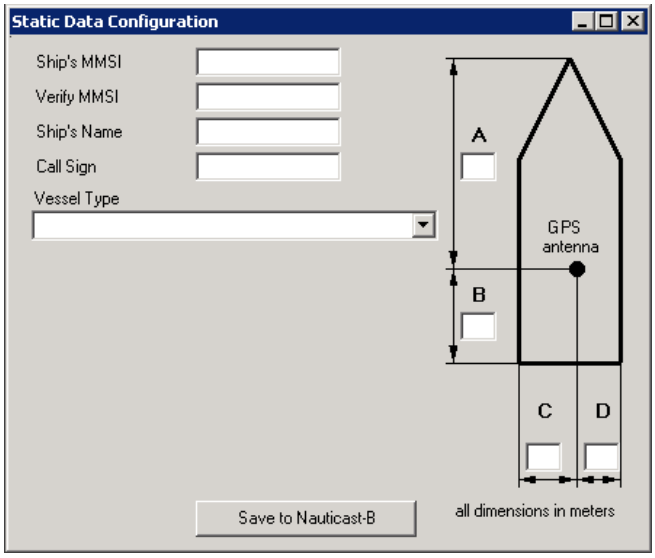
To configure the transponder all of the data fields must be completed and saved to the AIS.

WARNING: Per FCC rules (United States users only) the static data of the vessel cannot be changed once programmed. Do not program the static data unless you are certain you have the correct information. Please check the number entered carefully. If the static data programmed is incorrect the AIS transponder will need to be returned to ACR Electronics for factory reset.



Enter the vessel's information in the appropriate box:

- Ship's name - enter the name of the vessel (20 characters maximum)
- Call Sign - enter the vessel's radio call sign (7 characters maximum) (If your local authority does not require a call sign number, enter @@@@@@@)
- MMSI number - enter the vessel's Maritime Mobile Service Identity number
- Enter the vessel's dimensions as follows rounded to the nearest meter
    - Dimension A - distance from bow to GPS antenna location to the nearest meter
    - Dimension B - distance from the GPS antenna location to the stern to the nearest meter
    - Dimension C - distance from the port side to the GPS antenna location to the nearest meter
    - Dimension D - distance from the GPS antenna to the starboard side to the nearest meter
- Select the most appropriate vessel type from the drop down menu

CAUTION: If no MMSI is entered then the AIS transponder will operate in receive only mode and the red LED will remain on. The vessel's own position will not be transmitted. An MMSI must be entered to allow the AIS transponder to transmit its own position to other vessels.

When you have entered all of the vessel's data, double-check what you have entered for accuracy, then click the 'Save to Nauticast-B' button to program this configuration into the AIS transponder:

A warning will be displayed asking you to verify the MMSI number. The static data (including the MMSI) can only be changed by ACR Electronics once programmed into the transponder. Please check that the number displayed is correct before proceeding. If the number is incorrect click the 'No' button to cancel programming of the MMSI.

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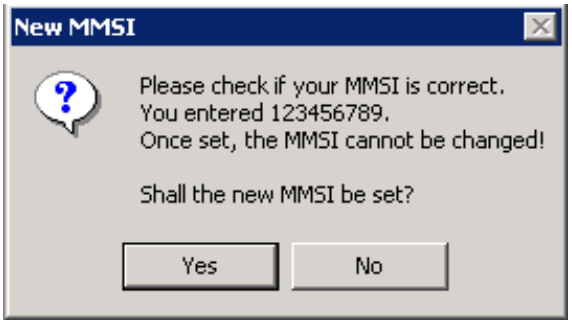


Click the 'Yes' button if the MMSI is correct.

The static data tab will be updated to show the newly programmed vessel information. The MMSI number will be displayed with a grey background to indicate that it has been programmed and cannot be changed.

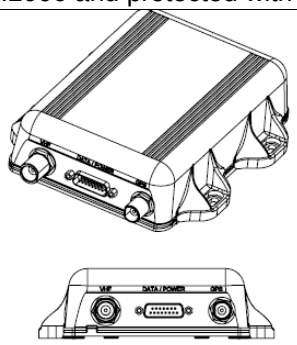
For additional software applications unrelated to the installation, please refer to the Link2AIS™ Software user guide for technical support.

11. Hardware installation

WARNING: The compass safe distance of this unit is 0.5m or greater for 0.3° deviation.

WARNING: Do not connect the Nauticast™-B AIS unit to a main (line) AC electrical supply, as an electric shock or fire hazard could result. Length of data/power cable connection must not exceed 3 meters.

CAUTION: Do not connect the Nauticast™-B AIS unit to a DC supply exceeding 15.6 V or reverse the supply polarity. Damage to the unit may result. Ensure the power supply is limited in accordance with EN 60950-1:2006 and protected with fuse or breakers not to exceed the specifications listed in this manual.



CAUTION: The Nauticast™-B AIS unit is designed for operation in the temperature range -25 °C to +55 °C. Do not install (or use) the Nauticast™-B AIS unit in environments which exceed this range.

CAUTION: Do not install the Nauticast™-B AIS unit in an environment where it can be subject to excessive exposure to water.

Electrical connections

WARNING: Only the data and power cables provided with the Nauticast™-B AIS unit should be used to connect antennas, power and display devices so as to maintain the integrity of the enclosure.

Please see the Appendix section of this manual for details of the power, data and RF cables supplied.

Using the two co-axial leads supplied, connect the down-lead from a VHF antenna to the VHF antenna port and connect the down-lead of a GPS antenna to the GPS antenna port. Please see Appendix A for a block diagram of the antenna installation.

If an external display unit (AIS capable chart plotter, MKD, etc.) is to be used, connect the data interface cable to the NMEA port. Depending on your model chart plotter, a NMEA multiplexer capable of handling AIS data (38,400 baud) may be required. Consult the chart plotter manufacturer's support materials for interface instructions.

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If using PC serial terminal with third party AIS capable Electronic Charting Software, connect the user end of the data interface cable to the display device. The software in the display device must be configured for AIS operation AND to accept standard Class B AIS operation NMEA sentences. This external display unit software is not part of the Nauticast™-B AIS transponder package. By rule, Class B AIS devices must output serial data. If your computer only has a USB port, you must use a serial-to-USB adapter, available at most consumer electronic retailers.

The Nauticast™-B requires a 12V DC power supply (9.6 – 15.6V) capable of supplying 2A peak surge. The power supply is a two wire system where the red wire is the positive lead and the black wire is the negative lead. The Nauticast™-B should be connected to the vessel's fuse panel that is supplied by the ship's 12V batteries.

CAUTION: If the vessel uses an AC generator that converts to DC power, the Nauticast™-B should be fully isolated from this system with the use of a fully isolated DC/DC converter.

Physical mounting

The unit shall be mounted on a vertical bulkhead with the cables in the down position. The mounting location should be protected from the weather and direct water spray. Typically this would be under the helm station or in the cabin.

It is recommended that the unit is attached to a solid surface with #10-32 x 1.2 self tapping head Phillips screws (provided in kit). A template for drilling pilot holes is included in this kit.

WARNING: The compass safe distance of this unit is 0.5m or greater for 0.3° deviation.

12. Antenna installation

Antenna connections on the transponder

GPS antenna

This is a TNC female bulkhead connector that mounts to the side of the transponder case. This port provides the 5V DC feed for the active GPS antenna required by the Nauticast™-B AIS unit.

VHF antenna

This is a UHF female PL-259 bulkhead connector that mounts to the side of the transponder case.

CAUTION: The GPS, VHF and power/data cables need to be secured to the bulkhead within 6" to 12" from the connectors. Avoid excess stress on connectors during installation. Strain relief should be used.

Antenna mounting

GPS antenna for AIS use

NOTE: If you are installing a Class B AIS transponder on a vessel because you are required to do so, you must use a separate VHF antenna and a separate GPS antenna dedicated to the Class B device in order to be compliant with the regulations. Use the antennas supplied with this kit.

The GPS antenna supplied for use with the Nauticast™-B is an active type (i.e. it includes LNA) and is suitable for marine shipboard applications (index of protection, ruggedness, means of mounting, ect). The supplied antenna supplies a minimum gain of 20dB to the Nauticast™-B after subtraction of the normal loss from antenna cable and connectors. The GPS antenna used for any AIS must be a dedicated antenna , i.e. not shared with any other GPS receiver. Installation of the GPS antenna is critical for the performance of the built in GPS receiver which is used for timing of the transmitted time slots and for the supply of navigational information should the ships main navigational GPS fail.

It is strongly recommended that:

- The GPS antenna is mounted in an elevated position and free of shadow effect from the ship's superstructure.

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- The GPS antenna has a free view through 360 degrees with a vertical angle of 5 to 90 degrees above the horizon.
- The GNSS antenna is placed as far away as possible from radar, Inmarsat and Iridium transmitters. Also ensure that the GPS antenna is free from direct view of the radar and the Inmarsat beam. The received GPS signal is very sensitive to noise and interference generated by other onboard transmitters.
- The MF/HF and other VHF transmitter antennas are kept as far away as possible from the GNSS antenna. It is good practice never to install a GNSS antenna within a radius of 2 meters from these antennas.

VHF antenna for AIS use

NOTE: If you are installing a Class B AIS transponder on a vessel because you are required to do so, you must use a separate VHF antenna and a separate GPS antenna dedicated to the Class B device in order to be compliant with the regulations. Use the antennas supplied with this kit.

The VHF antenna supplied for use with the Nauticast™-B is omni-directional, vertically polarized with unity gain (0 dB) and a band width sufficient to maintain VSWR <1.5 over the frequency range 156–163 MHz. As a minimum the 3dB bandwidth will cover the two AIS channels and the DCS channel. The antenna is also suitable for marine shipboard applications (index of protection, ruggedness, means of mounting, etc.).

If you elect to not use the antenna supplied, the alternate VHF antenna employed for AIS use:

- Must be a dedicated antenna, i.e. not shared with any other VHF transmitter/receiver.
- Should be mounted with at least a two meter vertical separation distance from any other VHF antenna used for speech or DCS communication. Also see Appendix for warnings such as “Radio Frequency Exposure Warning”.

SECTION 3 - USING THE TRANSPONDER

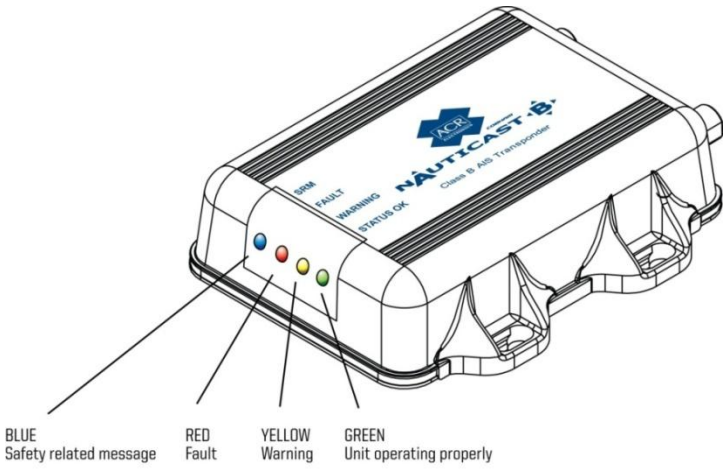
1. Switching ON

When the 12V supply is switched on, all four LEDs visible on the front panel of the unit will illuminate twice for a period of one second on each illumination. The blue LED will then go out. When the internal GPS starts outputting valid position information, the red LED will go out. When the Nauticast™-B AIS unit transmits its first position report (message 18), the yellow LED will go out. Note that this process may take up to 30 minutes depending on the switch-on state of the GPS receiver. When the yellow LED goes out the green LED will illuminate indicating that the unit is now operating correctly.

2. Warning and fault states

If the unit has not been able to transmit a position report during the last expected two reporting intervals (i.e. the nominal reporting interval cannot be maintained for operational reasons such as a Message 23 quiet period, high channel load conditions, etc.) the yellow LED will illuminate. This is a warning condition only and indicates that your vessel’s position is not currently being reported to other vessels. Reception of other vessel AIS information by the Nauticast™-B AIS is not affected. When the unit is able to commence reporting, the yellow LED goes out.

If a fault occurs the red LED will illuminate. This may illuminate briefly if the power supply is interrupted or if the VHF or GPS antenna characteristics are briefly affected.



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If the red LED illuminates continuously, the unit should be assumed to be faulty. It should either be switched off (power removed) or, if this is not practical, any other vessel position information derived from the unit should not be used. It should also be assumed that the unit is not transmitting valid position information for your vessel.

The unit should be examined by a competent equipment maintainer at the earliest opportunity.

More details on LED indications can be found in “LED Indicators” (below).

3. Data port messages

The data port will output the following:

- (At power-up) boot-loader and main application splash text screens including version numbers, and memory status
- Details of relevant AIS transmissions received
- Details of AIS transmissions sent
- Details of channel management messages received
- Alarm messages generated by the BIIT function

The data port will accept the following inputs:

- Programming information
- Alarm acknowledgements

Please see the ‘Data Interface’ section of this manual for more details of the data port messages.

When in operation, an AIS unit:

- Uses one of two VHF channels within the international marine band allocation (channel 87B; 161.975MHz, or channel 88B; 162.025MHz) to regularly transmit information such as the vessel position, Maritime Mobile Service Identity (MMSI), name, speed, course, etc.

- Receives similar information from other AIS equipped vessels within VHF range and outputs that information for use by an external display medium (AIS enabled chart plotter, PC using AIS enabled chart plotter software etc.)

4. Built-in test

The Nauticast™-B AIS unit is equipped with Built in Integrity Testing (BIIT). BIIT tests run continuously or at appropriate intervals simultaneously with the standard functions of the equipment. The BIIT detects any failure or malfunction that will significantly reduce integrity or stop operation of the Nauticast™-B AIS unit.

The tests include:

- AIS TX malfunction (synthesizer not locked and TX time-out not exceeded)
- Antenna VSWR exceeds limit
- Rx channel 1 malfunction (synthesizer not locked)
- Rx channel 2 malfunction (synthesizer not locked)
- Internal GNSS not in use
- No valid SOG information
- No valid COG information
- Background noise > -77dBm
- GPS failure
- VSWR exceeding the maximum allowed level
- The input voltage is out of the specified range

5. LED indicators

Power

This is a green LED which indicates, when lit, that power has been connected correctly to the transponder, that the transponder hardware has been configured, that the operating software is present, that the CPU has booted up and the application software is running.

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TX timeout

This is a yellow LED which indicates when lit that the CSTDMA transmitter is prevented from transmitting. Reasons for this include the following:

- The transponder's internal GPS receiver is not yet ready. The yellow LED will go out and the green LED will light when GPS receiver is ready.
- The transponder was unable to transmit an AIS message due to the channel being already occupied, e.g. by transmissions from other AIS transponders. Wait 10 minutes and verify GPS antenna connection.
- The transponder's internal GPS receiver is not operating. Contact your local dealer for service.

Error

This is a red LED which indicates, when lit, one of the following status conditions is possible:

- Transmitter lockout timer (1 second maximum) has operated
- GPS is unable to gain lock after 30 minutes
- VHF antenna VSWR is out of range
- Power Supply is out of range
- Background noise level is above the threshold level (-77dBm)
- MMSI is not entered

Blue LED

The unit has a blue LED that, when lit, indicates one of the following two conditions depending on how it is programmed:

- **Safety Related Message (SRM) status**
  The Safety Related Message (SRM) button (not included, recommend momentary contact switch rated for ≥ 25mA) has been depressed for more than 2 seconds and the pre-set SRM has been sent. If the SRM LED is illuminated it is not possible to send another SRM. An SRM can be sent once a minute. The payload within the message 14 transmission is the text string "MAYDAY MAYDAY".
- **Silent Mode Function (if user configures SRM switch to act as Silent Mode switch)**
  This indicates that the Silent Mode button has been depressed for more than 2 seconds and the pre-set Silent Mode has been activated. If the blue LED is illuminated you are not transmitting your AIS data to other vessels, your AIS is acting as a receive-only device. Depress the Silent Mode button a second time transmit your position data.

Both of these functions can be accessed through the Link2AIS™ software when a switch is not installed.

SECTION 4 - MAINTENANCE

WARNING: Unauthorized opening of the Nauticast™-B AIS system will invalidate the warranty.

CAUTION: Avoid using chemical solvents to clean the Nauticast™-B AIS as some solvents can damage the case material. To clean, wipe down with a damp cloth.

NOTE: The Nauticast™-B AIS contains no user serviceable parts. Contact your Service Agent for repair.

APPENDIX A - SERIAL DATA INTERFACE

1. Power/ Data connection

There is a 15-pin D-Sub female connector mounted on the side of the transponder case. The standard data/power cable assembly provided mates with this connector.

NOTE: Both thumb screws on the power/data cable will be tightened securely.

Power

12V DC (9.6-15.6V) is connected to the transponder power supply input via the data/power cable. The red wire is the positive lead and the black wire is the negative lead.

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Data

- A minimum keypad and display (MKD) unit, chart plotter or other display device may be connected to the Nauticast™-B AIS unit via the appropriate cable assembly. The default baud rate of the data link is 38.4k baud with 8 data bits, one stop bit and no parity.
- The data interface conforms to IEC 61162-1.
- VDM, VDO, ACA, ACS, ALR, TXT and ACK messages conform to NMEA 0183. Please refer to NMEA 0183 for full details of these AIS messages.

2. Serial Port Input/Output

There is one 9-pin serial port for data in RS232 format. There is one set of flying leads for data in RS422 format. Duplex capability is available from either or both ports.
The serial port interface(s) output:

- At power-up, boot-loader and main application splash text screens including version numbers and memory status.
- As a VHF Data Link Message (VDM) all incoming VHF Data Link (VDL) data received by the Nauticast™-B AIS.
- The VHF data link own vessel (VDO) messages sent by the Nauticast™-B AIS over the VHF Data Link.
- AIS regional channel assignment messages (ACA) received. These are derived from an incoming VHF Data Link message (message 22) or a DSC message.
- AIS channel management information source (ACS) messages.
- Alarm messages (ALR, TXT).

The data interface will accept:

- Personality programming messages
- Alarm acknowledgement messages (ACK)

3. Power up messages

On power up, the unit will report details of the firmware versions residing in the unit.

4. VHF data link messages (NMEA 0183 VDM)

This sentence is used to transfer the receipt of a VHF Data Link (VDL) message on either AIS radio channel, as defined in ITU-R M.1371, using the “Six-bit” field type. The structure provides for the transfer of long binary messages by using multiple sentences. Data messages should be transmitted in as few sentences as possible. When a data message can be accommodated in a single sentence, it is not split.

VDM message format

!--VDM,x1,x2,x3,a,s--s,x*hh<CR><LF>
field 1 2 3 4 5 6

Field	Format	Description
1	x	Total number of sentences needed to transfer the message[1], 1 to 9
2	x	Sentence number[1], 1 to 9
3	x	Sequential message identifier[2], 0 to 9
4	a	AIS Channel, "A" or "B"[3]
5	s---s	Encapsulated ITU-R M.1371 radio message[4]
6	x	Number of fill-bits[5], 0 to 5

NOTE 1 The length of an ITU-R M.1371 message may require the transmission of multiple sentences. The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1. These cannot be null fields.

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NOTE 2 The sequential message identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new multi-sentence message. The count resets to 0 after 9 is used. For a message requiring multiple sentences, each sentence of the message contains the same sequential message identification number. It is used to identify the sentences containing portions of the same message. This allows for the possibility that other sentences might be interleaved with the message sentences that, taken collectively, contain a single message. This shall be a null field for messages that fit into one sentence.

NOTE 3 The AIS channel is indicated as either “A” or “B”. This channel indication is relative to the operating conditions of the AIS unit when the packet is received. This shall be a null field when the channel identification is not provided. The VHF channel numbers for channels “A” and “B” are obtained by using a “query” (See IEC 61162-1, clause 5.3.2) of the AIS unit for an ACA sentence.

NOTE 4 This field supports a maximum of 62 valid characters for messages transferred using multiple sentences, and 63 valid characters for messages using a single sentence.

NOTE 5 This cannot be a null field. (See “x4” in IEC 61162-1, clause 5.3.3).

VDM message types

For example, the information contained in the s - - s portion of the VDM = Encapsulated ITU-R M.1371 radio message. Note that messages 5 and 19 may be sent as multi part messages using the x1, x2 and x3 parameters for message sequence control.

VDL Message number	VDM Message description
AIS Target Display Information	
1, 2, 3, 9,18, 21	position report
4	base station report
5*	voyage related data
19*	Class B – extended data
Safety message handling	
12	addressed safety related
14	broadcast safety related
External Application handling	
6	binary addressed
8	binary broadcast
System control	
7	binary acknowledge (INFO)
10	UTC and data inquiry (INFO)
11	UTC and data response (INFO)
13	safety related ack (INFO)
15	interrogation (INFO)
16	assignment mode command (INFO)
17	DGNSS corrections (INFO)
20	data link management (INFO)
22	channel management (INFO)

*Note that messages 5 and 19 may be sent as multi part messages.

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5. VHF data link own vessel messages (NMEA 0183 VDO)

This message describes your own vessel message being sent.

VDO message format

!--VDO,x1,x2,x3,a,s--s,x*hh<CR><LF>
field 1 2 3 4 5 6

Field	Format	Description
1	x	Total number of sentences needed to transfer the message[1], 1 to 9
2	x	Sentence number[1], 1 to 9
3	x	Sequential message identifier[2], 0 to 9
4	a	AIS Channel, "A" or "B"[3]
5	s---s	Encapsulated ITU-R M.1371 radio message[4]
6	x	Number of fill-bits[5], 0 to 5

NOTE 1 The length of an ITU-R M.1371 message may require the transmission of multiple sentences. The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1. These cannot be null fields.

NOTE 2 The Sequential message identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new multi-sentence message. The count resets to 0 after 9 is used. For a message requiring multiple sentences, each sentence of the message contains the same sequential message identification number. It is used to identify the sentences containing portions of the same message. This allows for the possibility that other sentences might be interleaved with the message sentences that, taken collectively, contain a single message. This shall be a null field for messages that fit into one sentence.

NOTE 3 The AIS channel is indicated as either “A” or “B”. This channel indication is relative to the operating conditions of the AIS unit when the packet is received. This shall be a null field when the channel identification is not provided. The VHF channel numbers for channels “A” and “B” are obtained by using a “query” (See IEC 61162-1, clause 5.3.2) of the AIS unit for an ACA sentence.

NOTE 4 This field supports a maximum of 62 valid characters for messages transferred using multiple sentences, and 63 valid characters for messages using a single sentence.

NOTE 5 This cannot be a null field. (See “x4” in IEC 61162-1, clause 5.3.3).

VDO Message number	VDO Message description
AIS Target Display Information	
13	Safety Related Acknowledgement
18	Standard Class B position report (Includes MMSI, SOG, position accuracy, lat, long, COG, true heading,)
24a	Class B “CS” Static data Part A (Includes MMSI and vessel name)
24b	Class B “CS” Static data Part B (MMSI, ship type, cargo type, call sign, ship dimensions)

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6. Regional Assignment Channel Assignment Message (NMEA 0183 ACA)

A Nauticast™-B unit can receive regional channel management information in two ways: ITU-R M.1371 message 22 or a DSC telecommand received on channel 70. Channel management information is applied based upon the actual location of the AIS device. An AIS unit is “using” channel management information when the information is being used to manage the operation of the VHF receiver and/or transmitter inside the AIS unit. This sentence is used both to enter and obtain channel management information. When sent to an AIS unit, the ACA sentence provides regional information that the unit stores and uses to manage the internal VHF radio. When sent from an AIS unit, the ACA sentence provides the current channel management information retained by the AIS unit. The information contained in this sentence is similar to the information contained in an ITU-R M.1371-1 message 22. The information contained in this sentence directly relates to the Initialization Phase and Dual Channel Operation and Channel Management functions of the AIS unit as described in ITU-R M. 1371.

ACA message format

$--ACA,x,llll.ll,a,yyyyy.yy,a,llll.ll,a,yyyyy.yy,a,x,xxxx,x,xxxx,x,x,x,a,x,hhmmss.ss
field 1 2 3 4 5 6 7 8 91011121314 15

Field	Format	Description
1	x	Sequence Number , 0 to 9
2	IIII, II, a	Region Northeast corner latitude – N/S
3	yyyyy.yy,a	Region Northeast corner longitude – E/W
4	IIII, II, a	Region Southwest corner latitude – N/S
5	yyyyy.yy,a	Region Southwest corner longitude – E/W
6	x	Transition Zone Size
7	xxxx	Channel A
8	x	Channel A bandwidth
9	xxxx	Channel B
10	x	Channel B bandwidth
11	x	Tx/Rx mode contro
12	x	Power level control
13	a	Information source
14	x	In-Use Flag
15	hhmmss.ss	Time of "in-use" change

7. Channel management information source messages (NMEA 0183 ACS)

This sentence is used in conjunction with the ACA sentence. This sentence identifies the originator of the information contained in the ACA sentence and the date and time the AIS unit received that information.

ACS message format

!-- ACS,x,xxxxxxxxx, hhmmss.ss,xx,xx,xxxx*hh<CR><LF>
field 1 2 3 4 5 6

Field	Format	Description
1	x	Sequence Number , 0 to 9
2	xxxxxxxxx	MMSI of originator
3	hhmmss.ss	UTC of receipt of channel management information
4	xx	UTC Day, 01 -31
5	xx	UTC Month, 01 -12
6	xxxx	UTC Year

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8. AIS alarm messages (NMEA 0183 ALR, Text)

Local alarm condition and status. This sentence is used to report an alarm condition on a device and its current state of acknowledgement.

ALR message format

!-- ALR,hhmmss.ss,xxx,A,A,c--c*hh<CR><LF>
field 1 2 3 4 5

Field	Format	Description
1	x	hhmmss.ss = Time of alarm (UTC)
2		Unique alarm number
3		Alarm condition
4		Alarm acknowledge state
5		Alarm description, text Alarm descriptions presented are: AIS: TX malfunction AIS: Antenna VSWR exceeds limit AIS: Rx channel 1 malfunction AIS: Rx channel 2 malfunction AIS: general failure AIS: no sensor position in use AIS: no valid SOG information AIS: no valid COG information AIS: 12V alarm AIS: 5V alarm AIS: Loss of serial interface integrity AIS: Background noise above -77dBm

9. ACK messages

An Acknowledge Message (ACK) can be generated by a minimum keypad and display (MKD) unit, chart plotter or other display device connected to the Nauticast™-B to acknowledge an alarm condition reported by the Nauticast™-B.

ACK message format

!-- ACK,xxx*hh <CR><LF>
field 1

Field	Format	Description
1	x	unique alarm number

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APPENDIX B - SPECIFICATIONS AND WARNINGS

1. Specifications

Parameter	Value
Dimensions	7.8 x 6.22 x 1.84 in. (198 x 158 x 46.7 mm)
Weight	13.2 oz (375g)
Power	DC (9.6-15.6V), two-wire with negative ground
	Average power consumption 4W
	Peak current rating 2A
GPS Receiver (AIS Internal)	IEC 61108-1 compliant
Electrical Interfaces	RS232 38400bps bi-directional
	RS422 NMEA 38400bps bi-directional
Connectors	VHF Antenna connector (UHF female bulkhead connector)
	GPS Antenna connector (TNC female bulkhead connector)
Cable – Power/Data	Power, RS232, RS422, SRM (15-pin Connector), 1.5 meter DSUB
VHF Transceiver	Transmitter x 1
	Receiver x 2 (One receiver time shared between AIS and DSC)
AIS1: 161.975 MHz AIS2: 162.025 MHz	Frequency: 156.025 to 162.025 MHz in 25 kHz steps
Output Power	33dBm ± 1.5 dB (2W)
Channel Bandwidth	25kHz
Channel Step	25kHz
Modulation Modes	25kHz GMSK (AIS, TX and RX)
	25kHz AFSK (DSC, RX only)
Bit rate	9600 b/s ± 50 ppm (GMSK)
	1200 b/s ± 30 ppm (FSK)
RX Sensitivity	Sensitivity – 107dBm 25kHz (Message Error Rate 20%)
	Co-Channel 10dB
	Adjacent Channel 70dB
	IMD 65dB
	Blocking 84dB
Environmental	IEC 60945
	Operating Temperature: -25ºC to +55ºC
	IEC 62287, IP67 (with cables installed)
Indicators	Power, TX timeout, status, pre-set SRM sent or Silent Mode
Operator Controls	Optional pre-set safety related message (SRM) transmit button or Silent Mode -No Transmit (user Configured).
Information reporting intervals	The Nauticast™-B AIS will transmit position reports (Message 18) in reporting intervals of: ▪ Every 30 seconds if SOG is > 2 kn; ▪ Every 3 Minutes if SOG is ≤ 2 kn Provided that the transmission time periods are available. A command received by Message 23 shall override the reporting interval. static data sub messages 24A and 24B will be transmitted every 6 minutes in addition to and independent of the position report.
Approvals	• USCG Approval Number: 165.156/3/0 • FCC ID B66ACR-AIS-300 • R&TTE Phoenix (NB#0700) Certificate Number: 07-110244 • BSH Approval Number: BSH/46162/4320519/2007
NOTE: For complete information regarding approvals, please visit ACR's website at www.acrelectronics.com	

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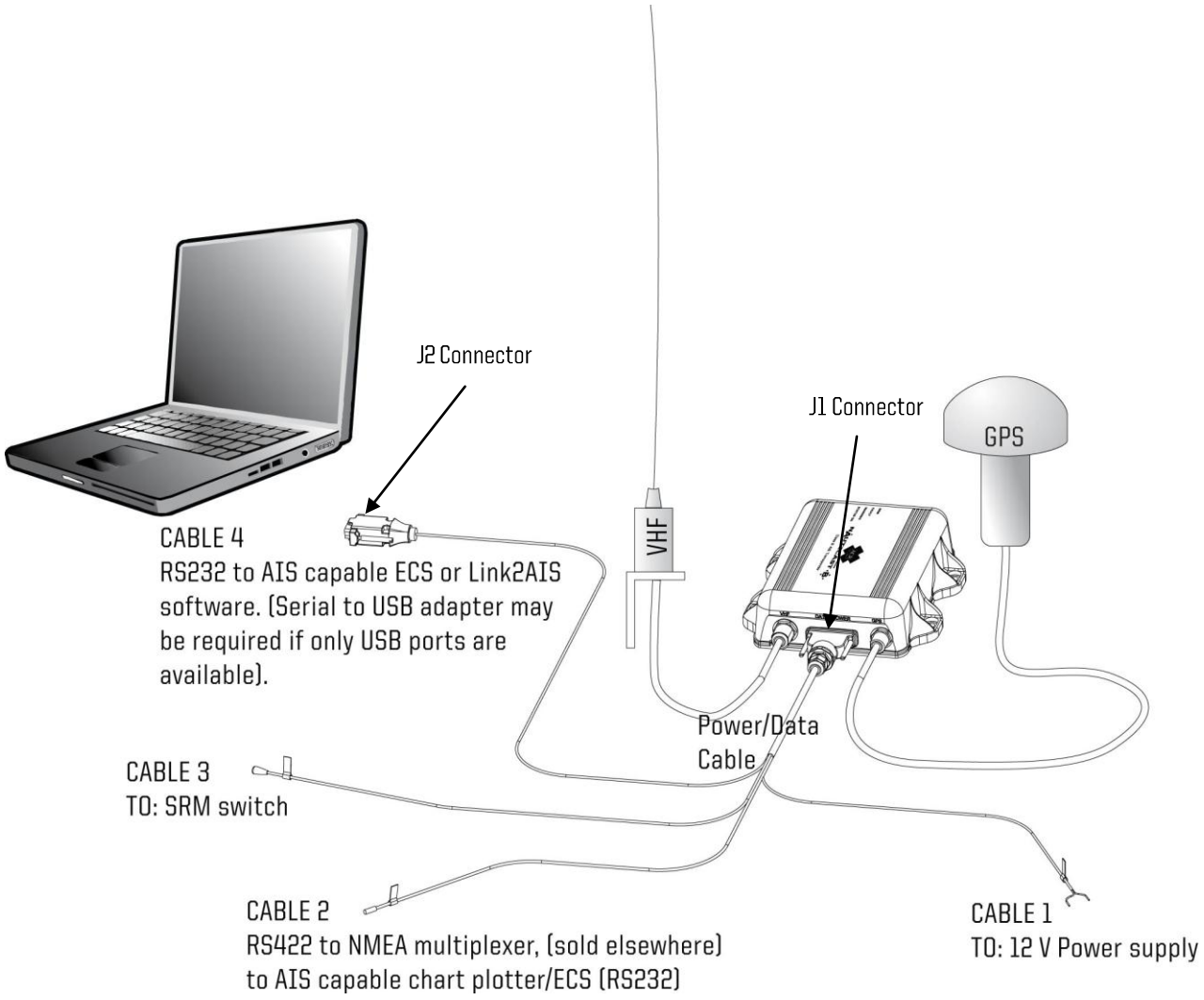
2. Warnings

WARNING regarding VHF antenna connection: Connecting a badly mismatched VHF antenna, leaving the VHF antenna port disconnected, or shorting the VHF antenna port will activate the VSWR alarm, causing the unit to stop sending position reports or causing damage to the transponder and activating the red LED.

WARNING regarding radio frequency exposure: To meet the requirements for Radio Frequency Exposure it is necessary to install the VHF antenna correctly and operate the AIS equipment according to the instructions.

APPENDIX C - SYSTEM BLOCK DIAGRAM


J2 Connector
J1 Connector
GPS
VHF
CABLE 4
RS232 to AIS capable ECS or Link2AIS software. (Serial to USB adapter may be required if only USB ports are available).
Power/Data Cable
CABLE 3
TO: SRM switch
CABLE 2
RS422 to NMEA multiplexer, (sold elsewhere) to AIS capable chart plotter/ECS (RS232)
CABLE 1
TO: 12 V Power supply

System Diagram

SRM Switch, PC, serial-to-USB adaptor, chart plotter, NMEA multiplexer not included
(Mount unit with cable side down)

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APPENDIX D - DATA POWER CABLE INFORMATION

Class B **A2-07-0196-1**
DATA POWER
CABLE

	J1	J2				
Description	**DB15**	**DB9**	**Wire Type**	**Color**	**AWG**	**CABLE #**
12V +	1		Tinned Copper	RED	18	CABLE1
12V -	9		Tinned Copper	BLACK	18	CABLE1
RS422 TX A	2		Tinned Copper	ORANGE	22-24	CABLE 2
RS422 RX A	3		Tinned Copper	YELLOW	22-24	CABLE 2
RS422 TX B	10		Tinned Copper	BLACK	22-24	CABLE 2
RS422 RX B	11		Tinned Copper	WHITE	22-24	CABLE 2
SW1GND	15		Tinned Copper	BLACK	22-24	CABLE 3
SW1 Switch	8		Tinned Copper	PURPLE	22-24	CABLE 3
RS232 TX	12	2	Tinned Copper	RED	22-24	CABLE 4
RS232 RX	13	3	Tinned Copper	BLUE	22-24	CABLE 4
GND	14	5	Tinned Copper	BLACK	22-24	CABLE 4

Note: Connectors J1 and J2 have shielded jackets with ground connection to metal shell of connector.
Cable 2 and Cable 3 have staggered length clipped conductors to prevent shorting and are capped with heat shrink.

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APPENDIX E - SUPPORT, WARRANTY, USEFUL LIFE and NOTICES

1. Support

Contact your local dealer for Nauticast™-B AIS support.
Please visit the ACR Website for Service centers near you.

ACR Electronics Europe GmbH
Handelskai 388 / Top 632
A-1020 Vienna, Austria
Tel: +43 (1) 5 237 237 - 0
Fax: +43 (1) 5 237 237 - 150
Email: technical.support@acr-europe.com
Web: www.acr-europe.com

ACR Electronics Inc.
Technical Service
5757 Ravenswood Road
Fort Lauderdale, FL 33312, U.S.A.
Tel.: +1 (954) 981-3333
Fax: +1 (954) 983-5087
Email: service@acrelectronics.com
Web: www.acrelectronics.com

2. Limited Warranty

This product is warranted against factory defects in material and workmanship for a period of 1 (one) year* from date of purchase or receipt as a gift. During the warranty period ACR Electronics, Inc. will repair or, at its option, replace the unit at no cost to you for labor, materials and return transportation from ACR. For further assistance, please contact our Technical Service Department at ACR Electronics, Inc., 5757 Ravenswood Road, Fort Lauderdale, FL 33312-6645. Email: service@acrelectronics.com, Fax: +1 (954) 983-5087, Telephone: +1 (954) 981- 3333.

This warranty does not apply if the product has been damaged by accident or misuse, or as a result of service or modification performed by an unauthorized factory. Except as otherwise expressly stated in the previous paragraph, THE COMPANY MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO THIS PRODUCT. The Company shall not be liable for consequential or special damages.

To place the warranty in effect, register online at www.acrelectronics.com or return the attached card within 10 days.

*Five years for the following products: EPIRB, PLB, S-VDR, SSAS

3. Useful Life Policy

The typical service life of a properly maintained Product is limited to 12 years from date of manufacture. Products that are 12 years and 1 month or older from date of manufacture will not be serviced by ACR or our Battery Replacement Centers. A Product that is 12 or less years old from date of manufacture will be serviced as long as the unit appears fit to be placed back into its final operational cycle. Service includes the replacement of those items that must be replaced at service intervals and the verification that the device appears to be in good mechanical and electrical working condition by an ACR authorized service technician.

4. Other notices

ACR Electronics diligently works to provide a high quality Product Support Manual, however, despite best efforts, information is subject to change without notice, and omissions and inaccuracies are possible. ACR cannot accept liability for manual contents. To ensure that you have the most recent version of the Product Support Manual, please visit the ACR website at www.acrelectronics.com.

In accordance with a policy of continual development and product improvement the Nauticast™-B hardware and software may be upgraded from time to time and future versions of the Nauticast™-B may therefore not correspond exactly with this manual. When necessary, upgrades to the product will be accompanied by updates or addendums to this manual.

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EC DECLARATION OF CONFORMITY

ACR Electronics, Inc. hereby declares that the following product is in conformity with Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on Radio equipment and Telecommunications Terminal Equipment (R&TTE), and has been type examined as follows. In accordance with the Directive, the product will be marked with the CE conformity marking as follows:

CE 0700 !

Product: Class B CSTDMA Automatic Identification System (AIS) Transponder
Trade Name: Nauticast-B
Model: AIS-300

Notified Body: Phoenix Testlab GmbH, Notified Body No. 0700
Königswinkel 10, D-32825 Blomberg, Germany
Certificate No. 07-110244

Regulations and Standards:
IMO MSC.74(69) Annex 3
ITU-R M.1371-1 (Class B)
IALA Technical Clarification of ITU-R M.1371-1 (Ed. 1.4)
ITU-R M.825-3
ITU-R M.1084-3
IEC 62287-1: 2006
IEC 60945: 2002
IEC 60950-1: 2006
IEC 61162-1: 2000
IEC 61162-2: 1998
IEC 61108-1: 2003

Manufacturer:
ACR Electronics Inc.
5757 Ravenswood Road
Fort Lauderdale, FL 33312
USA

European Representative:
ACR Electronics Inc.
(European Office)
1 Rose Cottages, Pitmore Lane,
Sway, Lymington, Hampshire
SO41 6BX UK

Signed on behalf of ACR Electronics, Inc.

Signed: _____
Name: Kerry Greer **Date: July 1, 2008**
Title: VP Engineering

Document AIS-300-001

This Declaration complies with ISO/IEC 17050-1:2004

ACR Electronics, Inc. is registered by UL to ISO 9001:2000

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